

$$E := 2 \cdot 10^5$$

$$AA := 250$$

$$LL := 2500$$

$$ZZ := 25$$

**First iteration:**

$$K_0 := \frac{E \cdot AA}{LL} \cdot \left( \frac{ZZ}{LL} \right)^2$$

$$K_0 = 2$$

$$w_1 := \frac{-7}{K_0}$$

$$w_1 = -3.5$$

$$N_1 := E \cdot AA \cdot \left[ \left( \frac{ZZ}{LL} \right) \cdot \left( \frac{w_1}{LL} \right) + \frac{1}{2} \cdot \left( \frac{w_1}{LL} \right)^2 \right]$$

$$N_1 = -651$$

**Second iteration:**

$$K_{11} := \frac{E \cdot AA}{LL} \cdot \left( \frac{ZZ}{LL} \right)^2 + \frac{E \cdot AA}{LL^3} \cdot \left( 2 \cdot ZZ \cdot w_1 + w_1^2 \right) + \frac{N_1}{LL}$$

$$K_{11} = 1.219$$

$$\text{del}_w1 := \frac{-7}{K_{11}}$$

$$\text{del}_w1 = -5.743$$

$$w_2 := \text{del}_w1 + w_1$$

$$w_2 = -9.243$$

Axial force

$$N2 := E \cdot AA \cdot \left[ \left( \frac{ZZ}{LL} \right) \cdot \left( \frac{w2}{LL} \right) + \frac{1}{2} \cdot \left( \frac{w2}{LL} \right)^2 \right]$$

$$N2 = -1.507 \times 10^3$$

**Third iteration:**

$$K22 := \frac{E \cdot AA}{LL} \cdot \left( \frac{ZZ}{LL} \right)^2 + \frac{E \cdot AA}{LL^3} \cdot \left( 2 \cdot ZZ \cdot w2 + w2^2 \right) + \frac{N2}{LL}$$

$$K22 = 0.192$$

$$\text{del\_w1} := \frac{-7}{K22}$$

$$\text{del\_w1} = -36.514$$

$$w3 := \text{del\_w1} + w2$$

$$w3 = -45.758$$

Axial force

$$N3 := E \cdot AA \cdot \left[ \left( \frac{ZZ}{LL} \right) \cdot \left( \frac{w3}{LL} \right) + \frac{1}{2} \cdot \left( \frac{w3}{LL} \right)^2 \right]$$

$$N3 = -776.459$$

**Fourth iteration:**

$$K33 := \frac{E \cdot AA}{LL} \cdot \left( \frac{ZZ}{LL} \right)^2 + \frac{E \cdot AA}{LL^3} \cdot \left( 2 \cdot ZZ \cdot w3 + w3^2 \right) + \frac{N3}{LL}$$

$$K33 = 1.068$$

$$\text{del\_w1} := \frac{-7}{K33}$$

$$\text{del\_w1} = -6.553$$

$$w4 := \text{del\_w1} + w3$$

$$w4 = -52.311$$

Axial force

$$N4 := E \cdot AA \cdot \left[ \left( \frac{ZZ}{LL} \right) \cdot \left( \frac{w4}{LL} \right) + \frac{1}{2} \cdot \left( \frac{w4}{LL} \right)^2 \right]$$

$$N4 = 483.465$$

**Fifth iteration:**

$$K44 := \frac{E \cdot AA}{LL} \cdot \left( \frac{ZZ}{LL} \right)^2 + \frac{E \cdot AA}{LL^3} \cdot \left( 2 \cdot ZZ \cdot w4 + w4^2 \right) + \frac{N4}{LL}$$

$$K44 = 2.58$$

$$\text{del\_w1} := \frac{-7}{K44}$$

$$\text{del\_w1} = -2.713$$

$$w5 := \text{del\_w1} + w4$$

$$w5 = -55.024$$

Axial force

$$N5 := E \cdot AA \cdot \left[ \left( \frac{ZZ}{LL} \right) \cdot \left( \frac{w5}{LL} \right) + \frac{1}{2} \cdot \left( \frac{w5}{LL} \right)^2 \right]$$

$$N5 = 1.106 \times 10^3$$

**Sixth iteration:**

$$K55 := \frac{E \cdot AA}{LL} \cdot \left( \frac{ZZ}{LL} \right)^2 + \frac{E \cdot AA}{LL^3} \cdot \left( 2 \cdot ZZ \cdot w5 + w5^2 \right) + \frac{N5}{LL}$$

$$K55 = 3.327$$

$$\text{del\_w1} := \frac{-7}{K55}$$

$$\text{del\_w1} = -2.104$$

$$w6 := \text{del\_w1} + w5$$

$$w6 = -57.128$$

Axial force

$$N6 := E \cdot AA \cdot \left[ \left( \frac{ZZ}{LL} \right) \cdot \left( \frac{w6}{LL} \right) + \frac{1}{2} \cdot \left( \frac{w6}{LL} \right)^2 \right]$$

$$N6 = 1.629 \times 10^3$$